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AUTHOR Hill, Clair S.
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ABSTRACT

The pilot study was designed to develop a system for analyzing and providing task inventories for carpentry curriculum development. An initial task inventory of 174 statements was constructed from available published sources, including only those tasks thought to be performed by incumbent workers in residential carpentry in Arizona. The tasks were grouped into the following duty categories: preparing for the job, forming for concrete, framing floors, framing walls, framing a roof, roofing, applying insulation, finishing exterior, finishing interior, and completing special operations. The task statements were assigned to the duty categories sequentially, as they are normally performed on the job. A random sample of 21 members of a carpenters union responded to the personally administered inventory by checking the tasks that each performed and by rating these tasks on a seven point relative time spent scale. The tabulated results list the task statements in descending order of performance frequency and also show ratings of percentage time spent revealing that a variety of tasks were normally performed by the workers. Recommendations to further validate the results are stated. The carpentry task inventory form is appended. (Author/MS)

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FINAL REPORT

PROJECT NO. 74-RMG-1315

A COMPUTERIZED TASK INVENTORY SYSTEM FOR PROVIDING CURRICULUM CONTENT

Conducted Under
Part C of Public Law 90-576

Clair S. Hill Ph.D
Northern Arizona University
Flagstaff, Arizona 86001

June 30, 1974

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SUMMARY OF THE REPORT

Time Period

This project was essentially a pilot study to establish data gathering procedures and collect data for improving the validity of course content for carpentry courses. Duration of the project was from May 20, 1975 to June 30, 1974.

Goals and Objectives

The goal of the project was to develop a system for analyzing and providing task inventories for curriculum development in vocational education.

Objectives were as follows:

1.1 Compile and have two experts verify a task inventory of the carpentry trade containing at least two-hundred statements.

1.2 Select a random sample of twenty incumbent carpenters in the Phoenix area and administer the revised task inventory to the sample.

1.3 Supervise and code all completed task inventory booklets for data processing.

1.4 Supervise the translation of the PL 1 task analysis program developed at The Ohio State University into a language which will be operable on the Yavapai Community College computer.

1.5 Distribute a report of the analyzed data obtained from the task inventory to each building trades teacher in the State. Each report will rank tasks according to percent of sample performing each task, and provide data on time spent by workers in performing tasks.

Procedures Followed

1.1.1 An initial task inventory was constructed from available published source materials.

1.2.1 A random sample was selected from the Carpenter's Union roster.

1.3.1 Task inventory was personally administered by the project director to insure a 100 percent return completion.

1.4.1 A computer programmer was retained at the computer center at the Yavapai College to translate and "debug" the programs.

1.5.1 A list of building trades teachers was obtained from the State Director of Trade and Industrial Education. A copy of the report was mailed to each teacher.

Results

An initial task inventory was developed by searching existing carpentry job descriptions, curriculum guides, and courses of study. Only those tasks that were thought to be performed by incumbent workers in residential carpentry in Arizona were included.

After the initial identification, the tasks were grouped into areas called duties. The duty categories for residential carpentry which were identified are:

A. Preparing for the Job
B. Forming for Concrete
C. Framing Floors
D. Framing Walls
E. Framing a Roof
F. Roofing
G. Applying Insulation
H. Finishing Exterior
I. Finishing Interior
J. Completing Special Operations

Task statements were then assigned to duty statements in the sequential order in which they are normally performed on the job. This arrangement was designed to help the incumbent carpenter follow the sequence of constructing a building in his mind as he completed the inventory. One-hundred seventy-four task statements were included in the initial task inventory.

The initial task inventory was then reviewed and revised by two consultants from the Central Arizona Carpenters Joint Apprenticeship and Training Committee. Mr. Earl E. Kropp, Apprenticeship Coordinator, served as the final evaluator.

Each consultant was asked to respond to each task statement individually and comment on its clarity, appropriateness, and order in the sequence. Revisions for the revised task inventory were finalized during a personal interview with Mr. Kropp.

A list of tasks developed are as follows:

A. Preparing for the Job

A.1 Read and study blueprints and specifications
A.2 Interpret symbols and abbreviations
A.3 Visualize buildings from working drawings
A.4 Analyze datum point and elevations
A.5 Develop materials list from specifications and blueprints
A.6 Calculate costs for site preparation and excavation
A.7 Calculate quantity and costs for concrete
A.8 Determine quantity and costs for masonry
A.9 Establish quantity and costs for carpentry
A.10 Calculate quantity and costs for electrical
A.11 Calculate quantity and costs for plumbing, heating and ventilation
A.12 Clear and prepare the site
A.13 Set up service transit level
A.14 Level service transit level
A.15 Sight service transit level
A.16 Read circle scale and vernier
A.17 Operate leveling rod
A.18 Give appropriate hand signals
A.19 Establish levels in relationship to datum point
A.20 Determine and mark elevations
A.21 Run straight lines and establish points on a line
A.22 Layout angles for irregular shaped building Set corner styles Set batterboards
A.23 Layout building lines
A.24 Check building layout with 6-8-10 method

B. Forming for Concrete

B.1 Arrange for excavation
B.2 Construct footing forms and level - Brace forms
B.3 Compact area if needed
B.4 Scatter gravel for base
B.5 Install reinforcing steel
B.6 Make pour for footings
B.7 Lay block for foundation wall
B.8 Lay vapor barrier
B.9 Install reinforcing wire mesh
B.10 Inspect forms and reinforcing steel
B.11 Order out concrete for floor
B.12 Vibrate concrete
B.13 Screed concrete to grade
B.14 Float surface of concrete Install anchor bolts
B.15 Finish surface to specifications
B.16 Cure concrete to ensure specified strength
B.17 Apply coats of sealer indicated
B.18 Apply seal coating to stem wall

C. Framing Floors

C.1 Install termite shield
C.2 Install and plumb posts to support beam
C.3 Cut, assemble and install a built-up beam
C.4 Layout, cut and anchor sill
C.5 Layout floor joist
C.6 Position and fasten floor joist
C.7 Layout and cut bridging
C.8 Install bridging to specifications
C.9 Install T & G plywood sub-flooring
C.10 Use pneumatic nailer for applying sub-floor

D. Framing Walls

D.1 Select and cut plates
D.2 Layout plates for studs and cripple studs
D.3 Cut studs to length
D.4 Layout and cut headers
D.5 Assemble headers
D.6 Build corner posts
D.7 Build partition posts
D.8 Rough frame all openings
D.9 Nail exterior wall section
D.10 Plumb brace and align exterior walls
D.11 Nail interior wall section
D.12 Raise interior wall sections
D.13 Plumb brace and align interior walls
D.14 Nail interior walls to specifications
D.15 Cut and install double plates
D.16 Cut and nail wall sheathing to exterior walls

E. Framing Roof

E.1 Cut and install ceiling joists with crown direction up
E.2 Layout and cut common rafters
E.3 Layout and cut hip rafters
E.4 Layout and cut valley rafters
E.5 Layout and cut jack rafters
E.6 Layout ridge board
E.7 Anchor rafters in place
E.8 Cut and install collar ties
E.9 Brace rafters
E.10 Rough frame louver openings
E.11 Layout, cut and install gable end studs
E.12 Build up and install overhang on gable ends
E.13 Rough frame openings for chimney
E.14 Rough frame openings for ventilators
E.15 Construct a truss
E.16 Cut and install sheathing
E.17 Install roof vents

F. Roofing

F.1 Order materials and supplies for roofing
F.2 Cut and apply felt paper
F.3 Cut and apply valley flashing
F.4 Cut and apply drip edge flashing
F.5 Apply metal step flashing to chimney
F.6 Lay starter row of asphalt shingles
F.7 Cover roof using asphalt shingles
F.8 Apply wood shingles to roof
F.9 Apply roll roofing
F.10 Apply mastic cement

G. Applying Insulation

G.1 Estimate insulation materials required
G.2 Order materials and supplies needed for building
G.3 Install bats between studs
G.4 Distribute loose fill between open ceiling joists
G.5 Lay vapor barrier in designated areas

H. Finishing Exterior

H.1 Read blueprints for window symbols
H.2 Identify types of windows
H.3 Install double hung window
H.4 Install awning type window
H.5 Install sliding type window
H.6 Install casement type window
H.7 Assemble a door frame
H.8 Install a door frame
H.9 Install fascia boards
H.10 Install lookouts
H.11 Install soffit
H.12 Install vents
H.13 Apply bevel siding
H.14 Apply board and batten siding
H.15 Apply tongue and groove siding
H.16 Apply wood shingles to exterior wall
H.17 Install starter strip for aluminum siding
H.18 Apply aluminum siding
H.19 Install necessary moldings
H.20 Layout and cut siding for gable ends
H.21 Caulk siding

I. Finishing Interior

I.1 Cut and install gypsum wallboard on ceiling
I.2 Apply ceiling tile to firring strips
I.3 Hang suspended ceiling
I.4 Cut and install gypsum wallboard
I.5 Locate and fasten plaster ground

I.6 Install corner bead
I.7 Cut and fasten paneling to walls
I.8 Install underlayment for wood floor
I.9 Lay hardwood floors
I.10 Assemble and set door jambs
I.11 Trim door openings
I.12 Fit door to opening
I.13 Hang door
I.14 Hang prehung door
I.15 Set stops
I.16 Install door hardware
I.17 Trim windows
I.18 Install window hardware and adjust
I.19 Run base and shoe
I.20 Cope inside corner moldings
I.21 Miter outside corner moldings
I.22 Install closet shelves and rods

J. Completing Special Operations

J.1 Make necessary calculations for a stair
J.2 Order materials for stairs
J.3 Layout stringers for stairs
J.4 Cut and install stringers
J.5 Cut and install risers
J.6 Cut and install tread
J.7 Fabricate straight-flight stair
J.8 Layout and construct landing
J.9 Layout and construct circular stair
J.10 Layout and construct elliptical stair
J.11 Cut and install handrails
J.12 Construct forms for concrete steps
J.13 Pour concrete steps
J.14 Finish concrete steps
J.15 Hang ready-made cabinets
J.16 Install counter top
J.17 Cut sink opening
J.18 Construct a custom wall cabinet
J.19 Construct a custom base cabinet

Evaluation

1.1.1.1 Review of the preliminary task inventory was conducted by two officials of the Carpenters' Union.

1.2.1.1 A random sample was selected with the help of the Carpenters' Union official.

1.3.1.1 A small sample of booklets was evaluated manually to insure scanning equipment reliability.

1.4.1.1 Data produced on the printout was compared with a small sample completed manually to insure reliability of program.

1.5.1.1 Acknowledgment of material received by teachers was determined by the return of a postcard included in each report to obtain comments on the value of the report to the building trades teachers.

Conclusions and Recommendations

Since this was essentially a pilot study to establish procedure, it is felt that the study should be expanded to include a larger sample and replicated in other areas of the State. Apprenticeship teachers and building trades teachers could help gather information in their area to further validate a basis for curriculum development in the carpentry trade. Advisory committees should also be approached to further validate the results of this study.

BODY OF THE REPORT

Problem Area

The question of what to teach has long been a subject of debate in vocational education. How does a vocational teacher keep abreast of the changes in the world of work? What are the essential tasks that a student should master for an entry level job? Is the course content up-to-date and related to the work that workers perform on the job? What are some basic hands-on activities that can be used for all levels of career education?

Many vocational teachers devise course content from their past experiences on the job. This is good, but their experience may have been limited or experienced a few years ago. Other teachers derive course content from textbooks, curriculum guides, or courses they have taken in the past. This content is often too theoretical in nature or out-of-date. Few courses are based on a current analysis of the occupational area itself.

Background Information

Over the years there have been a number of procedures developed for making an analysis of an occupation. Johann Heinrich Pestalozzi first utilized this process in Switzerland in 1775. Victor Della Vos refined the technique at the Imperial Technical School in Moscow, Russia. Charles R. Allen, Robert W. Selvidge and Verne Frycklund were vocational education leaders in this country who later refined the occupational analysis techniques and procedures.

The task inventory analysis technique is the latest and most practical approach. It was developed by the Air Force (AFM #35-2) for collecting, organizing and analyzing information performed by Air Force workers. Analyzed information is then used for developing and updating training programs all over the world. The task inventory analysis technique has also been utilized at The Center for Vocational and Technical Education at The Ohio State University.

A Task Inventory is a list of appropriate duty and task statements covering the tasks (skills) performed by workers in an occupational area. A Task is the basic unit of work activity which forms a significant part of a duty.

The teacher demonstrates to the class how to perform a single task. An example of a single task from a secretarial course would be: "Type and correct offset masters."

A duty is a large segment of work performed by an

individual. It is composed of several related tasks. Action words ending in "ing" (gerunds) are used to designate duties. "Performing Clerical Activities" is a major duty in a secretarial course.

Following are some of the advantages of the task inventory analysis technique.

1. The technique is economical.

2. Information collected is quantifiable and data can be manipulated and analyzed on the computer.

3. A printout can be provided for each teacher in the state who teaches in the occupational area.

4. Results of the inventory can be validated using statistical techniques and by advisory committees.

5. The technique yields information that is accurate.

Goal

1. To develop a system for analyzing and providing task inventories for curriculum development in vocational education.

Objectives

(a) Project director will compile and have two experts verify a task inventory of the carpentry trade containing at least two hundred statements.

(b) Project director will supervise the translation of the PL 1 task analysis program developed at The Ohio State University into a language which will be operable on the Yavapai Community College computer.

(c) Project director will select a random sample of twenty incumbent carpenters in the Phoenix area and administer the revised task inventory to the sample.

(d) Project director will supervise the scanning and coding of all completed task inventory booklets for data processing.

(e) Project director will distribute a report of the analyzed data obtained from the task inventory to each building trades teacher in the State. Each report will rank tasks according to percent of sample performing each task, and provide data on time spent by workers in performing tasks.

Project Design and Methodology.

An initial task inventory was developed by searching existing carpentry job descriptions, curriculum guides, and courses of study. Only those tasks that were thought to be performed by an incumbent worker in residential carpentry in Arizona were included. The primary sources of task statements used were:

(1) Building Trades I-Course Outline (1974)
Arizona Department of Education
Division of Vocational Education
1535 W. Jefferson
Phoenix, Arizona 85007

(2) Carpentry. A Suggested Course Outline (1970)
Instructional Materials Laboratory
Trade and Industrial Education
The Ohio State University
Columbus, Ohio 43210

(3) Building Industries Occupations Syllabus (1971)
The University of the State of New York
and the State Education Department
Bureau of Secondary Curriculum Development
Albany, New York 12224

(4) U. S. Department of Labor, United States Employment Service for the job titles of: (a) Carpenter Helper, (b) Carpenter-Cabinet Maker, (c) Carpenter-Rough, (d) Carpenter-Foreman

After the initial identification, the tasks were grouped into areas called duties. The duty categories for residential carpentry which were identified are:

1. Preparing for the Job
2. Forming for Concrete
3. Framing Floors
4. Framing Walls
5. Framing a Roof
6. Roofing
7. Applying Insulation
8. Finishing Exterior
9. Finishing Interior
10. Completing Special Operations

Task statements were then assigned to duty statements in the sequential order in which they are normally performed on the job. This arrangement was designed to help the incumbent carpenter follow the sequence of constructing a building in his mind as he completed the inventory. One-

hundred seventy-four task statements were included in the initial task inventory.

The initial task inventory was then reviewed and revised by two consultants from the Central Arizona Carpenters' Joint Apprenticeship and Training Committee. Mr. Earl E. Kropp, Apprenticeship Coordinator, served as the final evaluator.

Each consultant was asked to respond to each task statement individually and comment on its clarity, appropriateness, and order in the sequence. Revisions for the revised task inventory were finalized during a personal interview with Mr. Kropp.

Selection of the Worker Sample

A random sample of twenty-one incumbent workers in the carpentry trade was selected for the study. For convenience, the sample was selected from members of the Carpenter's Union Local 906. Members chosen were taken from the list of workers who were "in between" jobs. By utilizing this list of workers, it was possible to personally administer the inventory to each respondent at the Union Hall. This procedure insured one-hundred percent return of completed task inventories and reduced the time and cost of data collection.

The purpose of the study was briefly explained to each respondent, and then he was asked to complete the four background information questions on the cover page of the inventory form. Next, he was asked to read the directions on the first page. At this point, if there were no questions, he then checked the tasks which he performed and rated the tasks which he had checked on a seven (7) point relative time-spent scale. A rating of one (1) indicated that he spent very little time on that task compared with other tasks he performed. A rating of seven (7) indicated that he spent a very large amount of time on that task. Examples of the cover page and task inventory are included in Appendix A.

In order to make comparisons between incumbents on specific tasks, the relative time-spent ratings were converted to percentage values. These values were regarded as estimates of the percentage of work time spent by the respondent on each task. It was assumed that the sum of the respondent's raw ratings represent 100 percent of his work time. Based on this assumption, each raw rating may be expressed as a percentage of that total. The following formula was used in converting the raw ratings to percentages of time spent on each task:

$$\text{Percentage of time for each task} = \frac{\text{individual raw rating}}{\text{sum of all raw ratings by that individual}} \times 100$$

or

$$P = \frac{i_r}{\sum_{1}^{n} i_r}$$

Computer Programs

In order to analyze the data, four programs were written in Cobol to operate on the Yavapai Community College computer. The first program entitled "vocin.cbl" was developed to allow input of vocational information (duty, task, name) from the users terminal at a distant location. It also created a file to be used by the program "voclst.cbl" for the computations. "Vocin.cbl" could also list all information contained in the files.

Other programs developed were "vocadd.cbl" which performed the initial adding of a respondents data to the file. "Voccal.cbl" input raw time rating for a duty-task combination for use by "voclst.cbl". "Voclst.cbl" computed time percentages using data provided by "vocin.cbl". This program ("voclst.cbl") also compiled the table utilizing these figures and sorts tasks by percent of members performing and places this information in a hierarchy of descending order of importance.

These programs made it possible to enter data on a remote terminal. Each task inventory form was coded by a number. Then it was necessary to type a letter for the duty statement, a number for the task within that duty statement, and a number for the raw time rating for that task statement. Thus the data was entered for computer analysis from a terminal.

Results and accomplishments

An analysis of the data from the background information form presents some interesting findings. The distribution of respondents by job title and type of construction (Table 1) indicated that a large proportion of the respondents (70 percent) were employed as journeyman carpenters. Another 25 percent were employed as carpenter apprentices and 5 percent (one respondent) was employed as a foreman.

The largest proportion of respondents who were journeyman carpenters (40 percent) were working on commercial type construction. Twenty-five percent of the journeyman carpenters were working on residential construction. Only 5 percent of the apprentice carpenters were working on commercial construction and 20 percent we re working on residential construction. The foreman was working on commercial construction.

TABLE 1. DISTRIBUTION OF RESPONDENTS BY JOB TITLE AND TYPE OF CONSTRUCTION

TYPE OF CONSTRUCTION		JOB TITLE						
		Carpenter Apprentice	Journeyman Carpenter	Foreman	Superintendent	Sub-Contractor	General Contractor	Total
Residential	(N)	4	5	0	0	0	0	9
	(%)	20	25	0	0	0	0	45
Commercial	(N)	1	8	1	0	0	0	10
	(%)	5	40	5	0	0	0	50
Maint. & Repair	(N)	0	1	0	0	0	0	1
	(%)	0	5	0	0	0	0	5
Other	(N)	0	0	0	0	0	0	0
	(%)	0	0	0	0	0	0	0
Total	(N)	5	14	1	0	0	0	20
	(%)	25	70	5	0	0	0	100

The respondents were a stable group with a number of years in the trade as indicated in Table 2. The overall mean years of experience for the total sample was 13.8 years. Carpenter apprentices averaged 2.2 years of experience. Journeyman carpenters averaged 17.1 years of experience. The foreman indicated 16.0 years of experience.

TABLE 2. MEAN YEARS OF EXPERIENCE IN THE CARPENTRY TRADE BY JOB TITLE

Job Title	Mean Years Worked in the Carpentry Trade
Carpentry Apprentice	2.2
Journeyman Carpenter	17.1
Foreman	16.0
Superintendent	-
Sub-contractor	-
General Contractor	-
Overall Mean	13.8

The workers' responses by job title to the question of where they received their training in the carpentry trade is given in Table 3. It should be noted that a respondent could have checked more than one source of training.

The largest proportion (45.46 percent) of respondents in all positions received training on-the-job; 36.36 percent received training in apprenticeship programs; 12.12 percent received training at the high school level, and only 6.06 percent received training in the military.

Task Analysis

The task analysis for all respondents employed in the carpentry trade is given in Table 4. The letter and number in the column labeled D-TSK (duty-task) refers to the location of the task on the task inventory that was administered to the respondents. The letter refers to the duty

TABLE 3. FREQUENCY OF CARPENTER RESPONSES TO THE QUESTION OF WHERE THEY RECEIVED THEIR TRAINING BY JOB TITLE

TYPE OF TRAINING		JOB TITLE						
		Carpenter Apprentice	Journeyman Carpenter	Foreman	Superintendent	Sub-Contractor	General Contractor	Total
On-the-Job (Self-Learned)	(N)	4	11	0	0	0	0	15
	(%)	44.45	50.0	0	0	0	0	45.46
Military School	(N)	0	1	1	0	0	0	2
	(%)	0	4.55	50.00	0	0	0	6.06
Private Voc. School	(N)	0	0	0	0	0	0	0
	(%)	0	0	0	0	0	0	0
Apprenticeship Prog.	(N)	5	6	1	0	0	0	12
	(%)	55.55	27.27	50.00	0	0	0	36.36
High School Program	(N)	0	4	0	0	0	0	4
	(%)	0	18.18	0	0	0	0	12.12
Post-High Sc. Program	(N)	0	0	0	0	0	0	0
	(%)	0	0	0	0	0	0	0
Adult Educ. Program	(N)	0	0	0	0	0	0	0
	(%)	0	0	0	0	0	0	0
Total	(N)	9	22	2	0	0	0	33*
	(%)	100	100	100	0	0	0	100

*Any single respondent may have had more than one training experience.

heading under which the task was categorized and the number indicates the placement of the task under that duty heading. A complete list of the duties and task statements are given in Appendix A.

The four columns of figures to the right of the task statements have been calculated to show: (1) percent of members performing each task, (2) average relative time spent by the members performing the task, (3) average relative time spent by all members, and (4) cumulative sum of the average percent time spent by all members.

Examination of the task analysis revealed that a variety of tasks were performed by the workers as a part of their normal job. The tasks are listed in order of the percent of members performing as shown in the first column. Although a few of the tasks commonly done on construction received a low rating. Most of these tasks are performed by other trades rather than carpenters.

Recommendations

Since this was essentially a pilot study to establish procedure, it is felt that the study should be expanded to include a larger sample and replicated in other areas of the State. Apprenticeship teachers and building trades teachers could help gather information in their area to further validate a basis for curriculum development in the carpentry trade. Advisory committees should also be approached to further validate the results of this study.

TABLE 4. TASK ANALYSIS INDICATING PERCENTAGE PERFORMING AND TIME SPENT RATINGS

RANKED BY..	D-TSK	TASK TITLE	PERCENT OF MEMBERS PERFORMING	AVERAGE PERCENT TIME SPENT BY ALL MEMBERS PERFORMING	AVERAGE PERCENT TIME SPENT BY ALL MEMBERS	CUMULATIVE SUM OF AVERAGE PERCENT TIME SPENT BY ALL MEMBERS
C	9	Install T & G plywood sub-flooring	.9000	.0005	.0030	.0030
A	17	Operate leveling rod	.8500	.0004	.0023	.0053
D	15	Cut and install double plates	.8500	.0006	.0035	.0088
D	1	Select and cut plates	.8500	.0006	.0034	.0122
A	1	Read and study blueprints and specifications	.8000	.0005	.0026	.0149
D	13	Plumb brace and align interior walls	.8000	.0007	.0035	.0185
D	16	Cut and nail wall sheathing to exterior walls	.8000	.0006	.0034	.0219
D	10	Plumb brace and align exterior walls	.8000	.0006	.0035	.0254
E	1	Cut and install ceiling joists with crown direction up	.8000	.0006	.0035	.0289
D	5	Assemble headers	.8000	.0007	.0037	.0327
D	3	Cut studs to length	.8000	.0007	.0039	.0366
A	24	Check building layout with 6-8-10 method	.7500	.0005	.0030	.0396
B	2	Construct footing forms and level - brace forms	.7500	.0007	.0035	.0432
D	14	Nail interior walls to specifications	.7500	.0007	.0036	.0468
C	8	Install bridging to specifications	.7500	.0007	.0040	.0508
D	12	Raise interior wall sections	.7500	.0007	.0037	.0546
D	11	Nail interior wall section	.7500	.0007	.0036	.0582
D	9	Nail exterior wall section	.7500	.0007	.0036	.0619
D	8	Rough frame all openings	.7500	.0007	.0039	.0658
D	6	Build corner posts	.7500	.0007	.0039	.0697
C	7	Layout and cut bridging	.7500	.0007	.0039	.0736
D	4	Layout and cut headers	.7500	.0007	.0037	.0773
C	6	Position and fasten floor joist	.7500	.0007	.0038	.0812
D	2	Layout plates for studs and cripple studs	.7500	.0007	.0037	.0849
C	3	Cut, assemble, and install a built-up beam	.7500	.0006	.0030	.0880
A	18	Give appropriate hand signals	.7000	.0005	.0025	.0906
A	21	Run straight lines and establish points on a line	.7000	.0005	.0028	.0934

CUMULATIVE SUM OF AVERAGE PERCENT TIME SPENT BY ALL MEMBERS ----------
AVERAGE PERCENT TIME SPENT BY ALL MEMBERS ----------
AVERAGE PERCENT TIME SPENT BY ALL MEMBERS PERFORMING --
RANKED BY..PERCENT OF MEMBERS PERFORMING ----------

D-TSK		TASK TITLE				
D	7	Build partition posts	.7000	.0007	.0040	.0974
E	16	Cut and install sheathing	.7000	.0007	.0036	.1010
A	23	Layout building lines	.7000	.0005	.0027	.1038
C	5	Layout floor joist	.7000	.0007	.0039	.1077
C	4	Layout, cut, and anchor sill	.7000	.0006	.0032	.1109
I	16	Install door hardware	.7000	.0007	.0037	.1147
E	5	Layout and cut jack rafters	.7000	.0006	.0031	.1178
A	13	Set up transit level	.6500	.0004	.0024	.1203
G	3	Install bats between studs	.6500	.0006	.0031	.1234
I	22	Install closet shelves and rods	.6500	.0007	.0040	.1274
A	20	Determine and mark elevations	.6500	.0005	.0028	.1303
H	9	Install fascia boards	.6500	.0007	.0036	.1339
A	15	Sight transit level	.6000	.0005	.0028	.1367
A	19	Establish levels in relationship to datum point	.6000	.0005	.0030	.1397
A	3	Visualize buildings from working drawings	.6000	.0007	.0037	.1435
E	12	Build up and install overhang on gable ends	.6000	.0006	.0034	.1469
E	11	Layout, cut, and install gable end studs	.6000	.0006	.0031	.1500
E	9	Brace rafters	.6000	.0007	.0038	.1539
E	7	Anchor rafters in place	.6000	.0007	.0039	.1578
E	6	Layout ridge board	.6000	.0007	.0036	.1614
E	10	Rough frame louver openings	.6000	.0007	.0036	.1651
E	4	Layout and cut valley rafters	.6000	.0006	.0032	.1683
I	21	Miter outside corner moldings	.6000	.0008	.0043	.1727
I	20	Cope inside corner moldings	.6000	.0007	.0038	.1766
I	19	Run base and shoe	.6000	.0008	.0044	.1810
I	17	Trim windows	.6000	.0008	.0041	.1851
E	3	Layout and cut hip rafters	.6000	.0006	.0032	.1884

CUMULATIVE SUM OF AVERAGE PERCENT TIME SPENT BY ALL MEMBERS ----------
AVERAGE PERCENT TIME SPENT BY ALL MEMBERS ----------
AVERAGE PERCENT TIME SPENT BY ALL MEMBERS PERFORMING --
RANKED BY..PERCENT OF MEMBERS PERFORMING ----------

D-TSK		TASK TITLE				
I	15	Set stops	.6000	.0007	.0038	.1922
I	13	Hang door	.6000	.0008	.0041	.1963
I	12	Fit door to opening	.6000	.0008	.0041	.2004
I	10	Assemble and set door jambs	.6000	.0007	.0038	.2042
E	2	Layout and cut common rafters	.6000	.0006	.0034	.2076
H	8	Install a door frame	.6000	.0008	.0040	.2117
H	7	Assemble a door frame	.6000	.0007	.0037	.2154
H	11	Install soffit	.6000	.0007	.0038	.2192
C	2	Install and plumb posts to support beam	.6000	.0008	.0040	.2232
F	2	Cut and apply felt paper	.6000	.0006	.0034	.2267
J	16	Install counter top	.6000	.0008	.0041	.2308
I	7	Cut and fasten paneling to walls	.6000	.0007	.0038	.2347
A	22	Layout angles for irregular shaped building	.5500	.0006	.0034	.2381
I	11	Trim door openings	.5500	.0008	.0045	.2426
E	8	Cut and install collar ties	.5500	.0007	.0036	.2463
I	1	Cut and install gypsum wallboard on ceiling	.5500	.0007	.0039	.2502
H	10	Install lookouts	.5500	.0007	.0038	.2541
E	13	Rough frame openings for chimney	.5500	.0007	.0036	.2577
J	17	Cut sink opening	.5500	.0007	.0039	.2616
E	14	Rough frame openings for ventilators	.5500	.0007	.0037	.2653
J	15	Hang ready-made cabinets	.5500	.0008	.0045	.2698
H	15	Apply tongue and groove siding	.5500	.0007	.0036	.2735
A	14	Level transit level	.5000	.0005	.0028	.2763
A	2	Interpret symbols and abbreviations	.5000	.0008	.0043	.2807
H	13	Apply bevel siding	.5000	.0008	.0041	.2849
H	2	Identify types of windows	.5000	.0006	.0034	.2883
J	4	Cut and install stringers	.5000	.0007	.0038	.2921
J	3	Layout stringers for stairs	.5000	.0007	.0038	.2959

			CUMULATIVE SUM OF AVERAGE PERCENT TIME SPENT BY ALL MEMBERS	AVERAGE PERCENT TIME SPENT BY ALL MEMBERS	AVERAGE PERCENT TIME SPENT BY ALL MEMBERS PERFORMING	PERCENT OF MEMBERS PERFORMING
RANKED BY..						
D-TSK		TASK TITLE				
H	19	Install necessary moldings	.5000	.0009	.0046	.3035
H	1	Read blueprints for window symbols	.5000	.0007	.0037	.3043
H	14	Apply board and batten siding	.5000	.0007	.0039	.3082
J	12	Construct forms for concrete steps	.5000	.0007	.0040	.3122
J	11	Cut and install handrails	.5000	.0007	.0039	.3161
I	9	Lay hardwood floors	.5000	.0008	.0042	.3203
I	8	Install underlayment for wood floor	.5000	.0008	.0041	.3244
I	14	Hang prehung door	.5000	.0009	.0049	.3293
I	4	Cut and install gypsum wallboard	.5000	.0008	.0052	.3346
I	3	Hang suspended ceiling	.5000	.0008	.0042	.3388
H	6	Install casement type window	.5000	.0006	.0035	.3423
H	5	Install sliding type window	.5000	.0008	.0041	.3464
H	21	Caulk siding	.5000	.0008	.0045	.3510
H	20	Layout and cut siding for gable ends	.5000	.0009	.0047	.3557
J	8	Layout and construct landing	.5000	.0007	.0040	.3597
J	6	Cut and install tread	.5000	.0007	.0039	.3637
J	5	Cut and install risers	.5000	.0007	.0038	.3675
C	10	Use pneumatic nailer for applying sub-floor	.4500	.0012	.0062	.3737
F	9	Apply roll roofing	.4500	.0008	.0044	.3781
F	8	Apply wood shingles to roof	.4500	.0006	.0032	.3814
F	7	Cover roof using asphalt shingles	.4500	.0008	.0044	.3858
F	3	Cut and apply valley flashing	.4500	.0008	.0041	.3900
H	12	Install vents	.4500	.0008	.0044	.3944
J	7	Fabricate straight-flight stair	.4500	.0008	.0040	.3985
H	3	Install double hung window	.4500	.0007	.0039	.4024
J	1	Make necessary calculations for a stair	.4500	.0009	.0046	.4071
E	15	Construct a truss	.4500	.0008	.0040	.4111
E	17	Install roof vents	.4500	.0008	.0044	.4156

RANKED BY..PERCENT OF MEMBERS PERFORMING	CUMULATIVE SUM OF AVERAGE PERCENT TIME SPENT BY ALL MEMBERS	AVERAGE PERCENT TIME SPENT BY ALL MEMBERS	AVERAGE PERCENT TIME SPENT BY ALL MEMBERS PERFORMING	PERCENT OF MEMBERS PERFORMING

D-TSK		TASK TITLE				
A	9	Establish quantity and costs for carpentry	.4000	.0010	.0052	.4208
I	6	Install corner bead	.4000	.0011	.0058	.4267
G	5	Lay vapor barrier in designated areas	.4000	.0008	.0041	.4308
F	6	Lay starter row of asphalt shingles	.4000	.0008	.0044	.4353
I	18	Install window hardware and adjust	.4000	.0009	.0047	.4401
F	10	Apply mastic cement	.4000	.0009	.0049	.4450
B	10	Inspect forms and reinforcing steel	.4000	.0009	.0050	.4501
I	2	Apply ceiling tile to firring strips	.4000	.0009	.0049	.4551
J	19	Construct a custom base cabinet	.4000	.0008	.0043	.4594
J	18	Construct a custom wall cabinet	.4000	.0008	.0043	.4637
A	16	Read circle scale and vernier	.3500	.0009	.0049	.4686
A	4	Analyze datum point and elevations	.3500	.0010	.0054	.4740
F	5	Apply metal step flashing to chimney	.3500	.0007	.0038	.4779
F	4	Cut and apply drip edge flashing	.3500	.0008	.0044	.4824
B	14	Float surface of concrete install anchor bolts	.3500	.0009	.0049	.4874
H	18	Apply aluminum siding	.3500	.0008	.0045	.4919
H	17	Install starter strip for aluminum siding	.3500	.0008	.0045	.4964
H	16	Apply wood shingles to exterior wall	.3500	.0009	.0048	.5012
H	4	Install awning type window	.3500	.0010	.0051	.5063
C	1	Install termite shield	.3500	.0013	.0066	.5129
A	5	Develop materials list from specifications and blueprints	.3500	.0015	.0076	.5206
A	7	Calculate quantity and costs for concrete	.3000	.0007	.0040	.5246
F	1	Order materials and supplies for roofing	.3000	.0012	.0061	.5308
B	6	Make pour for footings	.3000	.0015	.0077	.5385
J	2	Order materials for stairs	.3000	.0012	.0061	.5447
B	5	Install reinforcing steel	.3000	.0012	.0061	.5509

RANKED BY..PERCENT OF MEMBERS PERFORMING	CUMULATIVE SUM OF AVERAGE PERCENT TIME SPENT BY ALL MEMBERS	AVERAGE PERCENT TIME SPENT BY ALL MEMBERS	AVERAGE PERCENT TIME SPENT BY ALL MEMBERS PERFORMING	
D-TSK TASK TITLE				
J 13 Pour concrete steps	.3000	.0011	.0056	.5566
B 9 Install reinforcing wire mesh	.3000	.0008	.0044	.5618
B 11 Order out concrete for floor	.2500	.0010	.0051	.5661
G 4 Distribute loose fill between open ceiling joists	.2500	.0012	.0063	.5724
I 5 Locate and fasten plaster ground	.2500	.0012	.0061	.5786
G 1 Estimate insulation materials required	.2500	.0013	.0069	.5856
G 2 Order materials and supplies needed for building	.2500	.0013	.0070	.5926
B 12 Vibrate concrete	.2500	.0011	.0057	.5984
B 8 Lay vapor barrier	.2500	.0013	.0069	.6053
B 13 Screed concrete to grade	.2500	.0015	.0077	.6130
A 12 Clear and prepare the site	.2000	.0022	.0116	.6246
B 1 Arrange for excavation	.1500	.0037	.0187	.6434
J 9 Layout and construct circular stair	.1500	.0019	.0100	.6534
J 14 Finish concrete steps	.1500	.0021	.0107	.6642
B 17 Apply coats of sealer indicated	.1500	.0025	.0129	.6771
B 3 Compact area if needed	.1500	.0024	.0123	.6894
A 6 Calculate costs for site preparation and excavation	.1000	.0041	.0218	.7105
J 10 Layout and construct elliptical stair	.1000	.0037	.0187	.7293
B 18 Apply seal coating to stem wall	.1000	.0031	.0159	.7452
A 8 Determine quantity and costs for masonry	.1000	.0041	.0210	.7663
B 4 Scatter gravel for base	.1000	.0041	.0211	.7874
B 16 Cure concrete to ensure specified strength	.1000	.0032	.0166	.8041
A 10 Calculate quantity and costs for electrical	.0500	.0136	.0695	.8736
B 7 Lay block for foundation wall	.0500	.0070	.0356	.9092
A 11 Calculate quantity and costs or plumbing, heating and ventilation	.0500	.0136	.0695	.9787
B 15 Finish Surface to Specifications	.0500	.0041	.0212	1.0000

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CARPENTRY TASK INVENTORY

BACKGROUND INFORMATION

1. Check your present job title:

Carpenter apprentice ____ Superintendent ___

Journeyman carpenter ____ Sub-contractor ___

Foreman ___ General Contractor ___

Other (specify) _____

2. Check the type of construction in which you presently work:

Residential ___ Maintenance and repair ___

Commercial ___ Other (specify) _____

3. How many years have you worked as a carpenter?

_____ years

4. Where did you receive your training in carpentry? (check one or more)

On-the-job (self-learned) ___ Apprenticeship program ___

Military school ___ High School program ___

Private vocational school ___ Post-high school program ___

Adult education program ___

CARPENTRY TASK INVENTORY

INSTRUCTIONS FOR COMPLETING TASK INVENTORY

Carefully read each of the Task Statements and place a check mark (✓) in the column labeled Check for each task which you perform on your present job.

After checking all tasks which you perform, then rate only the task you have checked by placing a number 1, 2, 3, 4, 5, 6 or 7 in the column labeled Time Spent which most closely estimates the amount of time you spend in performing the task.

Time spent means the total time you spend on each task you are rating, compared with the time you spend on each of the other tasks you do.

At the bottom on any page, write in and rate any tasks you do which are not listed.

CARPENTRY TASK INVENTORY — Page 1 of 11 Pages		
Listed below are a duty and the tasks which it includes. Check all tasks which you perform. Add any tasks you do which are not listed, then rate the tasks you have checked.	Check	Time Spent
A. Preparing for the Job	If Done	1. Very Much Below Average 2. Below Average 3. Slightly Below Average 4. About Average 5. Slightly Above Average 6. Above Average 7. Very Much Above Average
1. Read and study blueprints and specifications		
2. Interpret symbols and abbreviations		
3. Visualize buildings from working drawings		
4. Analyze datum point and elevations		
5. Develop materials list from specifications and blueprints		
6. Calculate costs for site preparation and excavation		
7. Calculate quantity and costs for concrete		
8. Determine quantity and costs for masonry		
9. Establish quantity and costs for carpentry		

Listed below are a duty and the tasks which it includes. Check all tasks which you perform. Add any tasks you do which are not listed, then rate the tasks you have checked.

A. Preparing for the Job	Check ✓ If Done	Time Spent (1. Very Much Below Average 2. Below Average 3. Slightly Below Average 4. About Average 5. Slightly Above Average 6. Above Average 7. Very Much Above Average)
10. Calculate quantity and costs for electrical		
11. Calculate quantity and costs for plumbing, heating and ventilation		
12. Clear and prepare the site		
13. Set up service transit level		
14. Level service transit level		
15. Sight service transit level		
16. Read circle scale and vernier		
17. Operate leveling rod		
18. Give appropriate hand signals		
19. Establish levels in relationship to datum point		
20. Determine and mark elevations		
21. Run straight lines and establish points on a line		
22. Layout angles for irregular shaped building Set corner styles set batterboards		
23. Layout building lines		
24. Check building layout with 6-8-10 method		

CARPENTRY TASK INVENTORY

Listed below are a duty and the tasks which it includes. Check all tasks which you perform. Add any tasks you do which are not listed, then rate the tasks you have checked.

B. Forming for Concrete	Check ✓ If Done	Time Spent (1. Very Much Below Average 2. Below Average 3. Slightly Below Average 4. About Average 5. Slightly Above Average 6. Above Average 7. Very Much Above Average)
1. Arrange for excavation		
2. Construct footing forms and level - Brace forms		
3. Compact area if needed		
4. Scatter gravel for base		
5. Install reinforcing steel		
6. Make pour for footings		
7. Lay block for foundation wall		
8. Lay vapor barrier		
9. Install reinforcing wire mesh		
10. Inspect forms and reinforcing steel		
11. Order out concrete for floor		
12. Vibrate concrete		
13. Screed concrete to grade		
14. Float surface of concrete Install anchor bolts		
15. Finish surface to specifications		
16. Cure concrete to ensure specified strength		
17. Apply coats of sealer indicated		
18. Apply seal coating to stem wall		

Listed below are a duty and the tasks which it includes. Check all tasks which you perform. Add any tasks you do which are not listed, then rate the tasks you have checked.

C. Framing floors	Check ✓ If Done	Time Spent (1. Very Much Below Average; 2. Below Average; 3. Slightly Below Average; 4. About Average; 5. Slightly Above Average; 6. Above Average; 7. Very Much Above Average)
1. Install termite shield		
2. Install and plumb posts to support beam		
3. Cut, assemble and install a built-up beam		
4. Layout, cut and anchor sill		
5. Layout floor joist		
6. Position and fasten floor joist		
7. Layout and cut bridging		
8. Install bridging to specifications		
9. Install T & G plywood sub-flooring		
10. Use pneumatic nailer for applying sub-floor		

Listed below are a duty and the tasks which it includes. Check all tasks which you perform. Add any tasks you do which are not listed, then rate the tasks you have checked.

D. Framing walls	Check ✓ If Done	Time Spent (1. Very Much Below Average 2. Below Average 3. Slightly Below Average 4. About Average 5. Slightly Above Average 6. Above Average 7. Very Much Above Average)
1. Select and cut plates		
2. Layout plates for studs and cripple studs		
3. Cut studs to length		
4. Layout and cut headers		
5. Assemble headers		
6. Build corner posts		
7. Build partition posts		
8. Rough frame all openings		
9. Nail exterior wall section		
10. Plumb brace and align exterior walls		
11. Nail interior wall section		
12. Raise interior wall sections		
13. Plumb brace and align interior walls		
14. Nail interior walls to specifications		
15. Cut and install double plates		
16. Cut and nail wall sheathing to exterior walls		

Listed below are a duty and the tasks which it includes. Check all tasks which you perform. Add any tasks you do which are not listed, then rate the tasks you have checked.

E. Framing roof	Check ✓ If Done	Time Spent (1. Very Much Below Average; 2. Below Average; 3. Slightly Below Average; 4. About Average; 5. Slightly Above Average; 6. Above Average; 7. Very Much Above Average)
1. Cut and install ceiling joists with crown direction up		
2. Layout and cut common rafters		
3. Layout and cut hip rafters		
4. Layout and cut valley rafters		
5. Layout and cut jack rafters		
6. Layout ridge board		
7. Anchor rafters in place		
8. Cut and install collar ties		
9. Brace rafters		
10. Rough frame louver openings		
11. Layout, cut and install gable end studs		
12. Build up and install overhang on gable ends		
13. Rough frame openings for chimney		
14. Rough frame openings for ventilators		
15. Construct a truss		
16. Cut and install sheathing		
17. Install roof vents		

Listed below are a duty and the tasks which it includes. Check all tasks which you perform. Add any tasks you do which are not listed, then rate the tasks you have checked.

F. Roofing	Check ✓ If Done	Time Spent (1. Very Much Below Average 2. Below Average 3. Slightly Below Average 4. About Average 5. Slightly Above Average 6. Above Average 7. Very Much Above Average)
1. Order materials and supplies for roofing		
2. Cut and apply felt paper		
3. Cut and apply valley flashing		
4. Cut and apply drip edge flashing		
5. Apply metal step flashing to chimney		
6. Lay starter row of asphalt shingles		
7. Cover roof using asphalt shingles		
8. Apply wood shingles to roof		
9. Apply roll roofing		
10. Apply mastic cement		

Listed below are a duty and the tasks which it includes. Check all tasks which you perform. Add any tasks you do which are not listed, then rate the tasks you have checked.

G. Applying insulation	Check ✓ If Done	Time Spent (1. Very Much Below Average 2. Below Average 3. Slightly Below Average 4. About Average 5. Slightly Above Average 6. Above Average 7. Very Much Above Average)
1. Estimate insulation materials required		
2. Order materials and supplies needed for building		
3. Install bats between studs		
4. Distribute loose fill between open ceiling joists		
5. Lay vapor barrier in designated areas		

Listed below are a duty and the tasks which it includes. Check all tasks which you perform. Add any tasks you do which are not listed, then rate the tasks you have checked.

H. Finishing exterior	Check ✓ If Done	Time Spent (1. Very Much Below Average 2. Below Average 3. Slightly Below Average 4. About Average 5. Slightly Above Average 6. Above Average 7. Very Much Above Average)
1. Read blueprints for window symbols		
2. Identify types of windows		
3. Install double hung window		
4. Install awning type window		
5. Install sliding type window		
6. Install casement type window		
7. Assemble a door frame		
8. Install a door frame		
9. Install fascia boards		
10. Install lookouts		
11. Install soffit		
12. Install vents		
13. Apply bevel siding		
14. Apply board and batten siding		
15. Apply tongue and groove siding		
16. Apply wood shingles to exterior wall		
17. Install starter strip for aluminum siding		
18. Apply aluminum siding		
19. Install necessary moldings		
20. Layout and cut siding for gable ends		
21. Caulk siding		

Listed below are a duty and the tasks which it includes. Check all tasks which you perform. Add any tasks you do which are not listed, then rate the tasks you have checked.

I. Finishing Interior	Check ✓ If Done	Time Spent (1. Very Much Below Average 2. Below Average 3. Slightly Below Average 4. About Average 5. Slightly Above Average 6. Above Average 7. Very Much Above Average)
1. Cut and install gypsum wallboard on ceiling		
2. Apply ceiling tile to firring strips		
3. Hang suspended ceiling		
4. Cut and install gypsum wallboard		
5. Locate and fasten plaster ground		
6. Install corner bead		
7. Cut and fasten paneling to walls		
8. Install underlayment for wood floor		
9. Lay hardwood floors		
10. Assemble and set door jambs		
11. Trim door openings		
12. Fit door to opening		
13. Hang door		
14. Hang prehung door		
15. Set stops		
16. Install door hardware		
17. Trim windows		
18. Install window hardware and adjust		
19. Run base and shoe		
20. Cope inside corner moldings		
21. Miter outside corner moldings		
22. Install closet shelves and rods		

Listed below are a duty and the tasks which it includes. Check all tasks which you perform. Add any tasks you do which are not listed, then rate the tasks you have checked.

J. Completing Special Operations	Check ✓ If Done	Time Spent (1. Very Much Below Average 2. Below Average 3. Slightly Below Average 4. About Average 5. Slightly Above Average 6. Above Average 7. Very Much Above Average)
1. Make necessary calculations for a stair		
2. Order materials for stairs		
3. Layout stringers for stairs		
4. Cut and install stringers		
5. Cut and install risers		
6. Cut and install tread		
7. Fabricate straight-flight stair		
8. Layout and construct landing		
9. Layout and construct circular stair		
10. Layout and construct elliptical stair		
11. Cut and install handrails		
12. Construct forms for concrete steps		
13. Pour concrete steps		
14. Finish concrete steps		
15. Hang ready-made cabinets		
16. Install counter top		
17. Cut sink opening		
18. Construct a custom wall cabinet		
19. Construct a custom base cabinet		